

**APPLICATION FOR
UNITED STATES LETTERS PATENT**

**METHOD AND SYSTEM FOR CHANGING A SUBSCRIBER PROFILE BASED ON
THE IDENTITY OF A BASE STATION SERVING THE SUBSCRIBER TERMINAL**

Inventor(s):

**Mika KESKI-HEIKKILÄ
Janne LINKOLA
Tuomo HOKKANEN**

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method and system for changing a subscriber
5 profile on the basis of the identity of the particular base station currently serving the subscriber's
terminal equipment in a mobile communication network.

2. Description of Related Art

It is expected that, in the near future, a growing demand will develop for various
10 applications and services that require identification of the particular base station currently
serving a subscriber's terminal equipment in mobile communication networks. The profile of a
travelling or moving subscriber can be modified, as for example by limiting or extending
services or changing available applications or their operation or features, as a function of the
network cell in whose area the subscriber is currently located. One current example of this
15 need is in home cell pricing policy, in accordance with which the charges for a subscriber's
calls are calculated at a reduced rate when the subscriber's terminal equipment is located
within the so-called home cell area or region.

In current mobile communication systems, however, it is difficult to implement
such changes in the subscriber profile on the basis of base station identity, primarily because
20 base stations do not have a permanent identity, i.e. one that is consistent for a period of months
or years. The CGI (Cell Global Identity) information that is currently transmitted in the

BCCH (Broadcast Control Channel) channel of a mobile communication network contains by way of example a cell identifier, but in network reconfigurations it is not uncommon that the cell identifiers must be changed. Some such changes apply to only a single base station at a time, so that applications and services could be designed to utilize the identifiers of a plurality of base stations, in which case changing the identifier of one of the base stations would not necessarily confuse the application or render it unusable. Other changes, such as Base Station Controller (BSC) switch-overs, simultaneously apply to and affect a large number of base stations, so that the aforementioned technique of monitoring a plurality of base stations for identification changes cannot be effectively or practically utilized. In short, designing and constructing a system for changing the subscriber profile on the basis of base station identity is at present either impossible or, at the very least, impractically expensive.

0064187-070700

OBJECTS AND SUMMARY OF THE INVENTION

It is accordingly the *desideratum* of the present invention to provide a method and system operable for eliminating, or at least greatly diminishing, the drawbacks and deficiencies of the prior art as for example hereinabove described.

It is a specific object of the invention to provide a method for changing a subscriber profile on the basis of the identity of the base station currently serving the subscriber's terminal equipment in a mobile communication network.

It is a further object of the invention to provide a system for changing the subscriber profile on the basis of the identity of the base station currently serving the subscriber's terminal equipment in a mobile communication network.

In accordance with the inventive method for changing a subscriber profile on the basis of the identity of the base station currently serving the subscriber's terminal equipment in a mobile communication network, information signals are sent by each base station and received by the terminal equipment of each subscriber, each of which terminal equipment typically comprises a mobile station provided with or including a subscriber identity module (SIM). The information signals sent by each base station include a permanent base station identity designation, and changes to each subscriber profile are made on the basis of the permanent identity designation of the base station currently serving that subscriber's terminal equipment, as received by that terminal equipment from the base station in whose communication service area the terminal equipment is currently located.

As compared with prior art, the present invention advantageously provides a more stable, extra or additional identity designation that is created for and assigned to each base station, this additional identity being transmitted by the base station to all of the subscriber terminal devices currently in its area or region of communication coverage. Thus, each terminal device is at all times kept informed as to the particular base station in whose area it is currently located. That base station identity designation is not changed in conjunction with network reconfiguration, as in prior art systems and methods. As a consequence, changing of a subscriber profile on the basis of the subscriber's movements is accomplished with enhanced flexibility, with considerably more ease, and at substantially lower cost than heretofore possible.

In embodiments of the inventive method, information signals may be transmitted in the cell broadcast channel (CBCH) or in any other suitable channel of the communication network, and the mobile communication network may be based on digital technology such, for example, as GSM (Global System for Mobile communications) technology or DCS1800 technology or the like.

The inventive system for changing a subscriber profile on the basis of the identity of the base station currently serving the subscriber's terminal equipment in a mobile communication network comprises a base station which is operative for transmitting information signals, and terminal equipment typically implemented by a mobile station provided with a subscriber identity module and which receives the information signals transmitted by the base station. The base station, or the inventive system, further comprises

means for inserting or including in the transmitted information signals a permanent base station identity designation or identifier unique to and associated with that base station. In addition, the terminal equipment includes means for changing the subscriber profile on the basis of the received permanent identity designator of the particular base station currently serving that terminal equipment.

In embodiments of the inventive system, the information signals may be transmitted in the cell broadcast channel (CBCH) or in any other suitable channel of the communication network, and the mobile communication network may be based on digital technology such, for example, as GSM technology or DCS1800 technology or the like.

Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are designed solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein like reference characters denote similar elements through the several figures:

5 Fig. 1a schematically depicts a system in accordance with the present invention;
and

Fig. 1b schematically depicts another system in accordance with the invention.

0941837 1070700

DETAILED DESCRIPTION OF THE CURRENTLY PREFERRED EMBODIMENTS

Fig. 1a depicts a mobile communication system, based in this particular embodiment on GSM (Global System for Mobile communications) technology, that includes by way of illustration four base stations 1¹, 1², 1³ and 1⁴. The base stations are connected to a base station controller (BSC) 3, which is in turn connected to a cell broadcast (CB) server 4. The cell broadcast server 4 includes or implements supervision software 41 that is used to create or assign, in accordance with the present invention, an extra or additional identity of a permanent nature for each of the base stations 1¹, 1², 1³ and 1⁴. In practice, this additional assigned identity may take the form, by way of nonlimiting example, of a sequence number or the like. The supervision software 41 and base station controller 3 are operable and configured to assure that the permanent identity thus assigned to each base station 1¹, 1², 1³ and 1⁴ is included in the information signal that is transmitted by the base station to all mobile equipment located in its communication coverage area or region. The supervision software 41 and base station controller 3 are further operatively responsible for continuing to maintain or preserve the same identity for each base station, even through and after changes are made in the network. The base stations 1¹, 1², 1³ and 1⁴ may, by way of currently preferred example, transmit the information signals in the cell broadcast channel (CBCH) or, alternatively, in any other suitable channel of the communication network.

Also depicted in Fig. 1a is a terminal or terminal equipment 2. As should be apparent, the system may include an almost unlimited number of such terminals, although only

002020 2231560

10

5 a single terminal 2 is shown by way of illustrative example and for ease of description. The terminal equipment typically takes the form of a mobile station that includes or is provided with a subscriber identity module (SIM). The terminal equipment 2 further includes means 5 for changing the subscriber profile on the basis of the identity of the particular base station that is currently serving that terminal, as received by the terminal from the base station. The means 5 may for example comprise software implemented in the subscriber identity module and/or a separate or separable or integrated device connected to the mobile station, and is additionally operable for receiving the information signal and, with it, the permanent identity designation of the base station currently serving the terminal equipment. Changes in the subscriber profile are then made on the basis of the received or known permanent identity designation of the base station in whose communication coverage area or region the terminal is currently located. A change in subscriber profile may comprise, for example, a decrease in the applicable call charges where the subscriber remains within the predetermined home cell(s) calling area or region.

15 Fig. 1b depicts a system generally corresponding to that shown in Fig. 1a but following a BSC switch-over, a network reconfiguration procedure commonly used in mobile communication systems. In the Fig. 1b illustrated arrangement after BSC switch-over, base stations 6¹, 6², 6³ and 6⁴ (which were originally controlled by a single base station controller) are now allotted to and among the several base station controllers 8, 9. In prior art

20 implementations, such a reconfiguration introduces changes in the base station identities. In accordance with the present invention, on the other hand, the identification parameter of each

base station remains the same, under the supervision and control of the supervision software 101 implemented in cell broadcast server 10 and the base station controllers 8 and 9. As in the Fig. 1a system, the terminal equipment 7 of Fig. 1b includes means 11 for changing the subscriber profile on the basis of the identity of the mobile station currently serving the terminal equipment.

Thus, while there have shown and described and pointed out fundamental novel features of the invention as applied to preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the methods and devices described and illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit of the invention. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the invention. Moreover, it should be recognized that structures and/or elements and/or method steps shown and/or described in connection with any disclosed form or embodiment of the invention may be incorporated in any other disclosed or described or suggested form or embodiment as a general matter of design choice. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.